

In the Claims

Claims 1-48 and 80-149 have been withdrawn. Please amend Claims 49, 50, 53, 60, 64-71 and 73, and add new claims 150-161 as follows:

1-48. (withdrawn)

49. (currently amended) In a system in which a boring tool is moved through the ground in a region, said system including a locator for tracking the position of and/or guiding the boring tool as the boring tool moves through the ground, a method comprising the steps of:

transmitting a locating signal from the boring tool using a transmitter that is selectively operable at a selected current one of at least two frequencies for use in tracking the boring tool by receiving the locating signal at the current frequency with the locator, and

indicating the a selected one of said frequencies frequency of the locating signal to the locator using a frequency code that is produced by a locating signal frequency control arrangement which forms part of the transmitter, which frequency code can individually identify each of said frequencies.

50. (currently amended) The method of claim 49 wherein the step of indicating the selected frequency includes the step of transmitting said a frequency code ~~indication~~ from the transmitter on a carrier frequency that is separate from said locating signal.

51. (original) The method of claim 50 wherein said boring tool moves underground having a pitch orientation and a roll orientation and said method further comprising the steps of sensing at least one of said pitch and roll orientations and transmitting the sensed pitch and roll orientations to the locator on said carrier frequency.

52. (original) The method of claim 50 wherein said indicating step is repeated at predetermined intervals in time.

53. (currently amended) The method of claim ~~50~~ 49 further comprising the steps of:
detecting a command issued to the transmitter in a predetermined way to change the selected frequency to a different one of said frequencies using said locating signal frequency control arrangement;

switching the ~~selected~~ current frequency of the locating signal ~~one of said frequencies~~ to the different one of the frequencies using the locating signal frequency control arrangement; and

sending at least one indication to the locator, responsive to detection of said command, designating the different one of the locating frequencies that is selected including the frequency code that is specific to the different frequency.

54. (original) The method of claim 53 wherein the step of detecting said command issued in said predetermined way includes the step of detecting a roll sequence to which said transmitter is subjected.

55. (original) The method of claim 53 wherein the step of sending the indication is performed at least once prior to said switching step.

56. (original) The method of claim 53 wherein the step of sending the indication is performed at least once following said switching step.

57. (original) The method of claim 53 wherein the step of sending the indication is performed at least once prior to said switching step and performed at least once following said switching step.

58. (original) The method of claim 53 further comprising the steps of:
using the locator, receiving the indication of the selection designating the different one of the locating frequencies;
and
switching the locator to the different one of the locating frequencies responsive to the receipt of said indication.

59. (original) The method of claim 58 wherein the locator includes a frequency control section and said step of switching the locator to the different one of the locating frequencies is automatically performed by said frequency control section upon receipt of said indication.

60. (currently amended) The method of claim 49 wherein said method further comprises the steps of:
detecting a command issued to the transmitter in a predetermined way to change the selected locating frequency to a different one of said locating frequencies, as compared to the current frequency, using said frequency control arrangement;
modulating said frequency code for the different frequency of the locating signal ~~indication~~ at least once on the locating signal for designating the selection of the different one of the locating frequencies to the locator; and
thereafter, switching the ~~selected~~ current one of said locating frequencies of the transmitter to the different one of the locating frequencies, as a new current frequency.

61. (original) The method of claim 60 wherein the step of detecting said command issued in said predetermined way includes the step of detecting a roll sequence to which said transmitter is subjected.

62. (original) The method of claim 49 wherein said locating signal is transmitted from a transmitter received in said boring tool and said method includes the step of performing said indicating step at least once responsive to powering up said transmitter.

63. (original) The method of claim 49 further comprising the steps of:
using a frequency selection arrangement forming part of the transmitter, detecting the selected one of said locating frequencies as a transmitter power-down locating frequency at a time when the transmitter is switched from a transmitter operational state to a transmitter off state;
restarting the transmitter at least initially configured to resume transmitting at the transmitter power-down locating frequency upon switching from the transmitter off state to the transmitter operational state; and
repeating said indicating step at least once responsive to restarting the transmitter.

64. (currently amended) In a system including a transmitter configured for installation in a boring tool which is moved through the ground in a region, said system further including a locator for tracking the position of and/or guiding the boring tool using the locating signal, said transmitter comprising:

a first arrangement for transmitting a locating signal at a current ~~selected~~ one of at least two locating frequencies for receipt by the locator; and

a locating signal frequency control arrangement for indicating ~~a the selected one of the~~ locating frequency frequencies of the locating signal to the locator using a frequency code which can individually identify each of said frequencies.

65. (currently amended) The transmitter of claim ~~64~~ 63 wherein the first arrangement and the locating signal frequency control arrangement are configured for cooperatively transmitting ~~a selected locating frequency indication to indicate the selected locating frequency to the locator and for the selected locating frequency code corresponding to a different one of said locating frequencies, as the selected frequency and which is different from the current frequency,~~ indication at least once prior to changing the current ~~selected~~ locating frequency to the different locating frequency.

66. (currently amended) The transmitter of claim 64 wherein said locating signal frequency control arrangement is configured for transmitting a carrier frequency separate from said locating signal and for transmitting ~~said a selected locating frequency code indication~~ on said carrier frequency to indicate the selected frequency of the locating signal to the locator.

67. (currently amended) The transmitter of claim 66 wherein said boring tool moves underground having a pitch orientation and a roll orientation and wherein said transmitter further comprises an orientation sensing arrangement for sensing at least one of said pitch and roll orientations for cooperating with the locating signal frequency control arrangement to transmit the sensed pitch and roll orientations to the locator on said carrier frequency.

68. (currently amended) The transmitter of claim 66 configured for repeatedly sending the ~~selected locating frequency code indication~~ to the locator at predetermined intervals in time.

69. (currently amended) The transmitter of claim 66 wherein the frequency control arrangement is configured to send the ~~selected locating frequency code indication corresponding to a different one of the locating frequencies, as the selected frequency and which is different from the current frequency,~~ at least once after changing the current ~~selected~~ locating frequency to the different locating frequency.

70. (currently amended) The transmitter of claim 66 wherein the frequency control arrangement is configured to send the ~~selected locating frequency code indication corresponding to a different one of the locating frequencies, that is different from the current frequency,~~ at least once before and at least once after changing the current ~~selected~~ locating frequency to the different locating frequency.

71. (currently amended) The transmitter of claim ~~64~~ 66 wherein said frequency control arrangement is configured for detecting ~~a said command issued to the transmitter in a said predetermined way to change the selected frequency to a different one of said frequencies including an arrangement for detecting as a roll sequence to which said transmitter is subjected.~~

72. (original) The transmitter of claim 64 wherein said frequency control arrangement is configured for indicating the selected locating frequency at least once responsive to powering up said transmitter.

73. (currently amended) In a system in which a boring tool is moved through the ground in a region, said system

including a locating arrangement for tracking the position of and/or guiding the boring tool as the boring tool moves through the ground, said locating arrangement comprising:

a transmitter forming part of the boring tool for transmitting a locating signal at a current selected one of at least two locating frequencies and for transmitting a frequency designation identifying one of said frequencies ~~the selected locating frequency~~ of the locating signal; and

a locator which receives ~~configured for receiving the frequency designation and~~ the locating signal for use in tracking the boring tool and including a frequency tracking arrangement for switching the locator between different ones of the locating frequencies, as the current locating frequency, based on said frequency designation.

74. (original) The locating arrangement of claim 73 wherein said locator is configured for automatically switching between said frequencies based on said frequency designation.

75. (original) In a system in which a boring tool is moved underground in a region, said boring tool being configured for transmitting a locating signal therefrom at least during the underground movement of the boring tool for receipt by a locator for use in tracking the boring tool, a method comprising the steps of:

configuring the transmitter for transmitting the locating signal at a selected one of at least two locating frequencies;

using a control arrangement forming part of the locator, detecting the selected one of said locating frequencies as a power-down locating frequency at a time when the locator is initially powered down; and

thereafter, powering up the locator at least initially configured for receiving the power-down locating frequency.

76. (original) In a system in which a boring tool is moved through the ground in a region, said system including a locating arrangement for tracking the position of and/or guiding the boring tool as the boring tool moves through the ground, said locating arrangement comprising:

a transmitter forming part of the boring tool for transmitting a locating signal at a selected one of at least two locating frequencies; and

a locator configured for receiving the locating signal for use in tracking the boring tool and including a frequency control arrangement for detecting the selected one of said locating frequencies as a locator power-down locating frequency at a time when the locator is initially powered down and, thereafter, for causing the locator to power-up at least initially configured for receiving the locator power-down locating frequency.

77. (original) The locating arrangement of claim 76 wherein said transmitter is configured for sending an indication of the selected frequency of the locating signal to the locator.

78. (original) The locating arrangement of claim 77 wherein said transmitter includes a frequency selection arrangement at least for detecting the selected one of said locating frequencies as a transmitter power-down locating frequency at a time when the transmitter is switched from a transmitter operational state to a transmitter off state and for restarting the transmitter at least initially configured to resume transmitting at the transmitter power-down locating frequency upon switching from the transmitter off state to the transmitter operational state.

79. (original) The locating arrangement of claim 77 wherein said frequency selection arrangement is configured for


sending said frequency selection indication at least once responsive to restarting the transmitter.

80-149. (withdrawn)

 Please add the following new claims 150-161: 

150. (new) In a system in which a boring tool is moved through the ground in a region, said system including a locator at least for tracking the position of the boring tool as the boring tool moves through the ground, a method comprising:
transmitting a locating signal from the boring tool using a transmitter that is selectively operable at a current one of at least two operating frequencies for use in locating the boring tool by receiving the current operating frequency with the locator, and

configuring said transmitter and said locator in a way which causes the locator to respond dynamically to a change of the current one of the operating frequencies, as said transmitter is selectively switched between the two operating frequencies, such that the locator tracks the current operating frequency.

 151. The method of claim 150 including identifying one of said operating frequencies to the locator using a frequency code that is produced by a locating signal frequency control arrangement which forms part of the transmitter, which frequency code can individually identify each of said operating frequencies.

152. (new) The method of claim 151 wherein identifying indicates an identified operating frequency which is, at least initially, different from the current operating frequency at which the transmitter is currently transmitting.

153. (new) The method of claim 151 wherein identifying indicates an identified operating frequency which is the same as the current operating frequency at which the transmitter is currently transmitting.

154. (new) The method of claim 151 including comparing, using said locator, the current operating frequency to the identified operating frequency.

155. (new) The method of claim 154 including performing one of (i) maintaining the current operating frequency if the identified operating frequency is equal to the current operating frequency and (ii) changing the current operating frequency to the identified operating frequency, as a new operating frequency, if the current operating frequency is different from the identified operating frequency.

156. (new) In a system in which a boring tool is moved through the ground in a region, said system including a locator at least for tracking the position of the boring tool as the boring tool moves through the ground, an arrangement comprising:

transmitting means for transmitting a locating signal from the boring tool using a transmitter that is selectively operable at a current one of at least two operating frequencies for use in locating the boring tool by receiving the current operating frequency with the locator, and

receiving means, forming part of said locator, for cooperating with said transmitter in a way which causes the locator to respond dynamically to a change of the current one of the operating frequencies, as said transmitter is selectively switched

between the two operating frequencies, such that the locator tracks the current operating frequency.

157. (new) The arrangement of claim 156 wherein said transmitting means includes locating signal frequency control means for identifying one of said operating frequencies to the locator receiving means using a frequency code, which frequency code can individually identify each of said operating frequencies.

158. (new) The arrangement of claim 157 wherein said locating signal frequency control means indicates an identified operating frequency to the locator receiving means which is, at least initially, different from the current operating frequency at which the transmitter is currently transmitting.

159. (new) The arrangement of claim 157 wherein said locating signal frequency control means indicates an identified operating frequency to the locator receiving means which is the same as the current operating frequency at which the transmitter is currently transmitting.

160. (new) The arrangement of claim 157 wherein each of said locating signal frequency control means and said locator receiving means are configured for comparing the current operating frequency to the identified operating frequency.

161. (new) The arrangement of claim 160 wherein each of said locating signal frequency control means and said locator receiving means are configured for performing one of (i) maintaining the current operating frequency if the identified operating frequency is equal to the current operating frequency and (ii) changing the current operating frequency to the identified operating frequency, as a new operating frequency, if the current operating frequency is different from the identified operating frequency.
